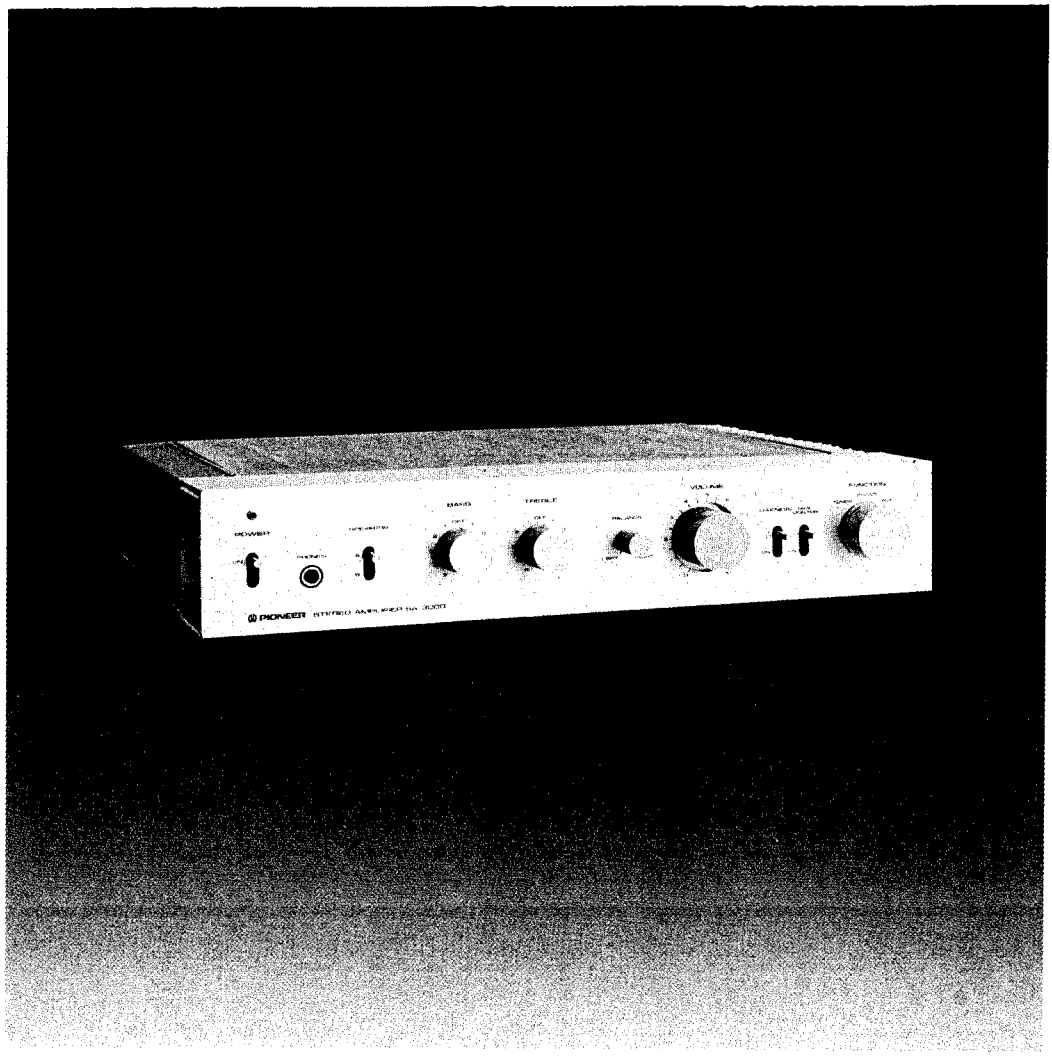


Service Manual

STEREO AMPLIFIER

SA-3000

PIONEER®

MODEL SA-3000 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
HE	220V and 240V (Switchable)	Europe or Oceania model
HB	220V and 240V (Switchable)	United Kingdom model
KU	120V only	U.S.A. model
S	110V, 120V, 220V and 240V (Switchable)	General export model
S/G	100V, 120V, 220V and 240V (Switchable)	U.S. Military model

- **This service manual is applicable to the HE and HB types. When repairing the KU, S and S/G types, please see the additional service manual (ART-379-0).**

CONTENTS

1. SPECIFICATIONS 3
2. FRONT PANEL FACILITIES 4
3. DISASSEMBLY 5
4. PARTS LOCATION 6
5. BLOCK DIAGRAM 8
6. CIRCUIT DESCRIPTIONS 9
7. ADJUSTMENT 10
8. EXPLODED VIEW 11
9. SCHEMATIC DIAGRAM, P.C. BOARD PATTERNS AND PARTS LIST
   - 9.1 Miscellanea 14
   - 9.2 Schematic Diagram 15
   - 9.3 P.C. Board Connection Diagram 18
   - 9.4 Parts List of P.C. Board Assemblies 21
10. PACKING 22
11. SUPPLEMENT FOR HB TYPE 23

1. SPECIFICATIONS

Semiconductors

Transistors 30
Diodes 22

Amplifier Section

Continuous Power Output of 40 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.02% total harmonic distortion.

Continuous Power Output at 1kHz (both channels driven)
T.H.D 0.02%, 8 ohms. . . . . .44 watts per channel
Total Harmonic Distortion (20 Hertz to 20,000 Hertz, 8 ohms, from AUX)
Continuous rated power output . . . No more than 0.02%
20 watts per channel power output . No more than 0.01%
1 watt per channel power output . . No more than 0.03%
Intermodulation Distortion (50 Hertz : 7,000 Hertz = 4 : 1, 8 ohms, from AUX)
Continuous rated power output . . No more than 0.005%
20 watts per channel power output
. . . . . No more than 0.004%
1 watt per channel power output . . No more than 0.01%
Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms) . . . 30
Input (Sensitivity/Impedance)
PHONO. . . . . 2.5mV/50 kilohms
TUNER, AUX, TAPE PLAY . . . . . 150mV/50 kilohms
PHONO Overload Level (T.H.D 0.01%, 1,000Hz)
PHONO. 230mV
Output (Level/Impedance)
TAPE REC . . . . . 150mV/3 kilohms
Frequency Response
PHONO (RIAA Equalization)
. . . . . 20Hz to 20,000Hz, ±0.3dB
TUNER, AUX, TAPE PLAY
. . . . . 10Hz to 100,000Hz, $^{+0}_{-3}$ dB
Tone Control
BASS . . . . . ±10dB (100Hz)
TREBLE . . . . . .±10dB (10 kHz)
Loudness Contour (Volume control set at –40dB position)
. . . . . +6dB (100Hz), +3dB (10,000Hz)
Hum and Noise (IHF, Short-circuited, A network)
PHONO. 86dB
TUNER, AUX, TAPE PLAY 100dB
Hum and Noise (DIN, continuous power/50mW)
PHONO. 72dB/58dB
TUNER, AUX, TAPE PLAY 84dB/60dB

Miscellaneous

Power Requirements . . . . . AC 220/240V, 50/60Hz
Power Consumption . . . . . 330W (max.)
Dimensions . . . . . 380(W) x 83(H) x 295(D) mm
14-15/16(W) x 3-1/4(H) x 11-5/8(D) in
Weight . . . . . Without Package; 7.6kg (16lb 12oz)
With Package ; 8.1kg (17lb 14oz)

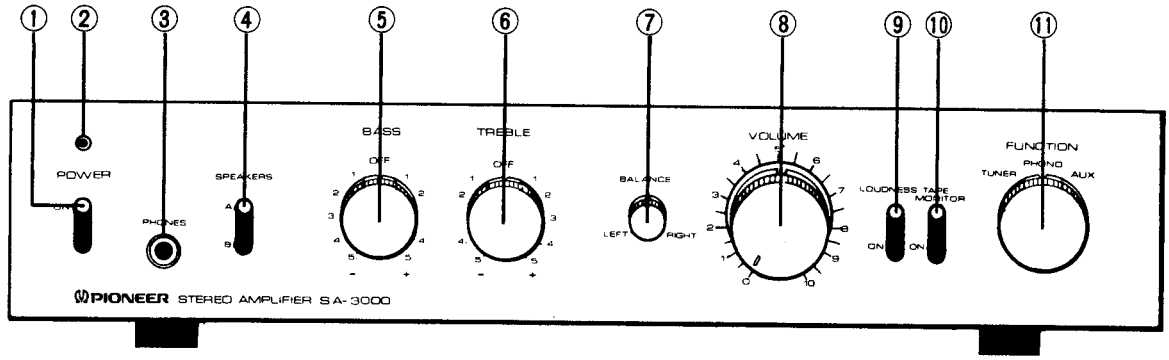
Furnished Parts

Operating Instructions 1

**Measured pursuant to Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifier.*

NOTE:
Specifications and the design subject to possible modification without notice due to improvements.

2. FRONT PANEL FACILITIES



① POWER SWITCH

Set this switch to ON to supply power to the amplifier. There will be a short delay when it is set to ON, because the muting circuit has been actuated to suppress the unpleasant noise that is sometimes generated when the power is switched on and off.

② POWER INDICATOR

When the POWER switch is set to ON this lamp lights up, indicating the amplifier is turned on.

③ HEADPHONE JACK

Insert the headphones plug into this jack when you want to listen to a stereo performance on your stereo headphones. Once the plug is connected, no sound will be heard through the speakers.

④ SPEAKERS SWITCH

Use this switch to select the speaker systems.

A . . . . Sound obtained from speakers connected to the SPEAKERS terminals A.

B . . . . Sound obtained from speakers connected to the SPEAKERS terminals B.

⑤ BASS CONTROL
⑥ TREBLE CONTROL

When turned clockwise from the OFF position, the response in the bass or treble range, respectively, is boosted. Turning counterclockwise attenuates the response. At the OFF position the tone control circuit is bypassed and frequency response is flat.

⑦ BALANCE CONTROL

Use this control to balance the volume of the left and right channels. The usual way to set the BALANCE knob is to set it first to the center position and listen to a performance. Then reproduce a mono program source (such as an AM broadcast) and set the knob so that the sound appears to be located exactly in the center between the left and right speakers.

⑧ VOLUME CONTROL

Use this control to adjust the volume of the speakers and headphones. There will be no sound when the control is set to the '0' position. To increase the volume, rotate the knob slowly clockwise.

⑨ LOUDNESS SWITCH

When listening to a performance with the volume control turned down, set this switch to ON and the bass and treble will be accentuated.

When the volume is low, the human ear finds it harder to hear the bass and treble than when the volume is high. The LOUDNESS switch is thus designed to compensate for this deficiency. By setting it to the ON position, the bass and treble come through much more strongly and the sound takes on a punch even when the VOLUME control is turned down.

⑩ TAPE MONITOR SWITCH

Set this switch to the ON position when monitoring a tape performance on a tape deck which you have connected to the TAPE jacks or when monitoring a recording.

NOTE:
Set the switch to the upper (OFF) position when listening to records or broadcasts, etc.

⑪ FUNCTION SELECTOR SWITCH

Set this switch to select the program source. Turn the VOLUME control down first before selecting a different position while the sound from one program source is being reproduced.

TUNER: When listening to AM broadcasting or FM broadcasting with the tuner connected to the TUNER jacks.

PHONO: When playing a record on the turntable connected to the PHONO jacks.

AUX: When listening to an audio component connected to the AUX jacks.

3. DISASSEMBLY

Top Cover

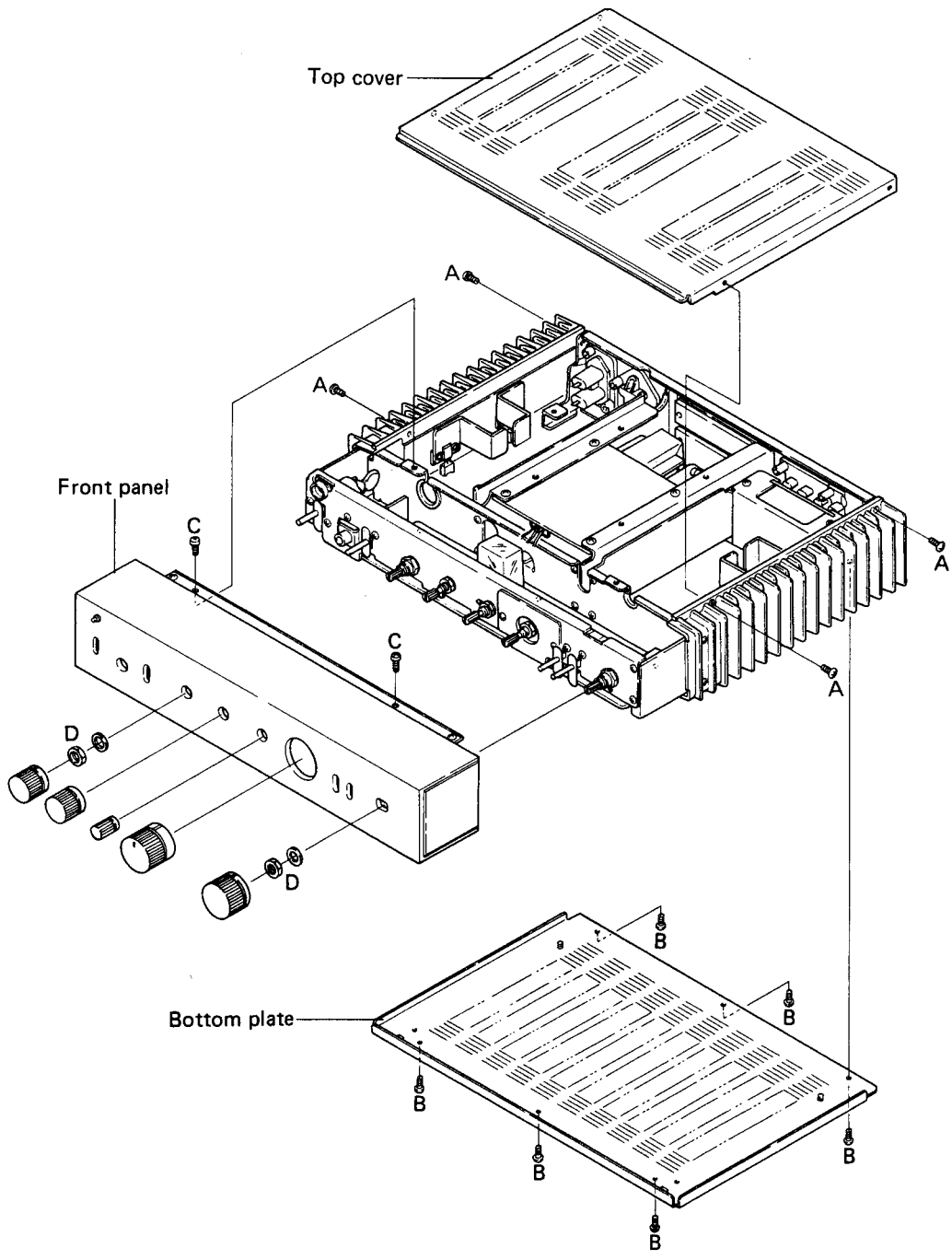
Remove the four screws A.

Bottom Plate

Remove the six screws B.

Front Panel

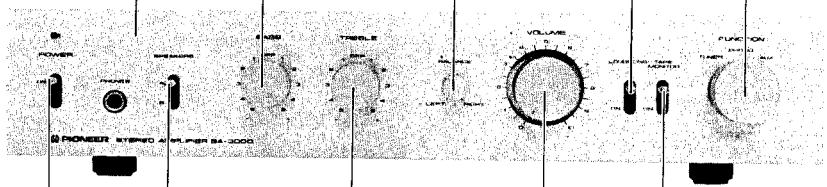
1. Remove the all control knobs.
2. Remove the two screws C and two nuts D, and then gently pull the front panel.



4. PARTS LOCATION

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Front Panel View



Knob (BASS)
AAB-191

Knob (BALANCE)
AAB-192

Knob (LOUDNESS)
AAD-150

Front panel assembly
ANB-695

Knob (FUNCTION)
AAB-190

Knob (POWER)
AAD-150

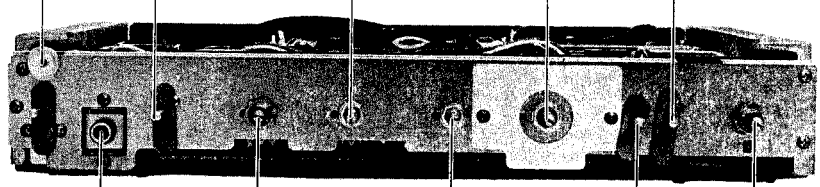
Knob (TAPE MONITOR)
AAD-150

Knob (SPEAKERS)
AAD-150

Knob (TREBLE)
AAB-191

Knob (VOLUME)
AAB-189

Front View with Panel Removed



Lever switch (SPEAKERS)
ASK-148

Variable resistor (TREBLE)
ACT-123

Variable resistor (VOLUME)
ACV-184

Lamp with wire
AEL-069

Lever switch (TAPE MONITOR)
ASK-148

Phones jack
AKN-024

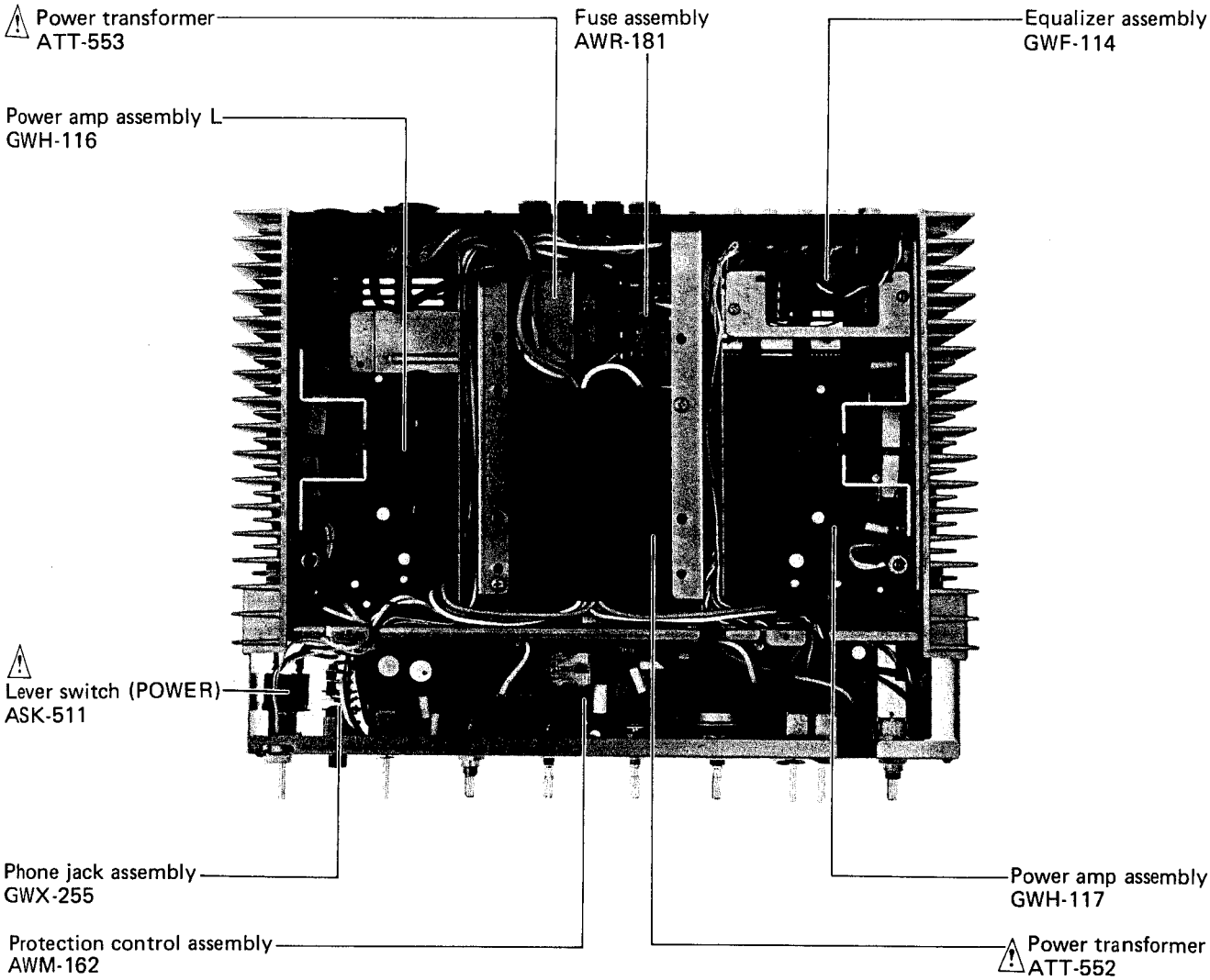
Slide rotary (FUNCTION)
ASD-071
(ASE-110)

Variable resistor (BASS)
ACT-122

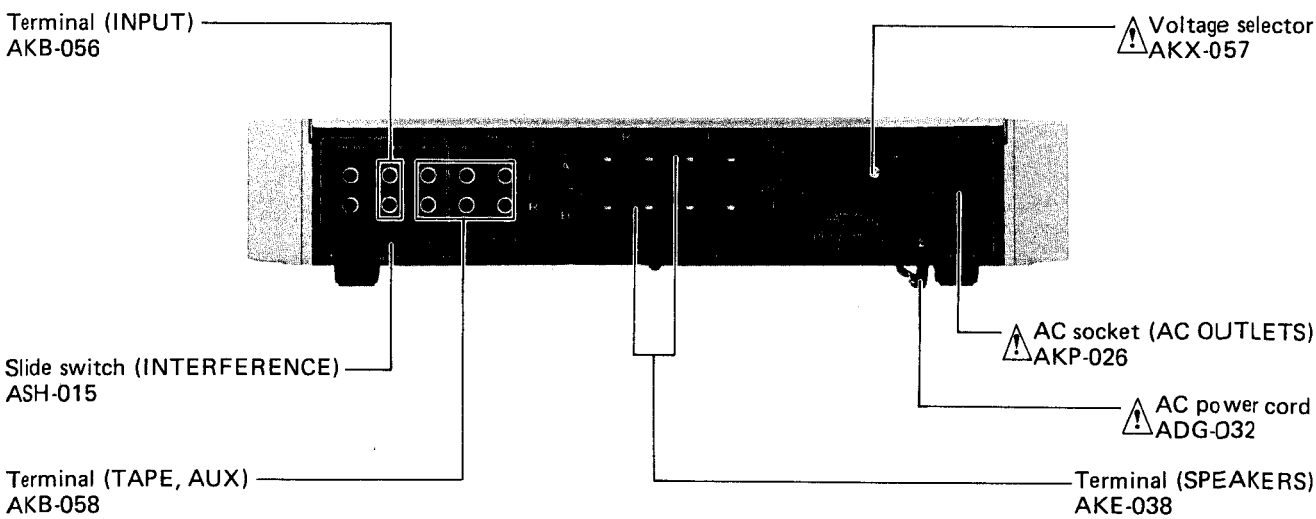
Variable resistor (BALANCE)
ACT-118

Lever switch (LOUDNESS)
ASK-147

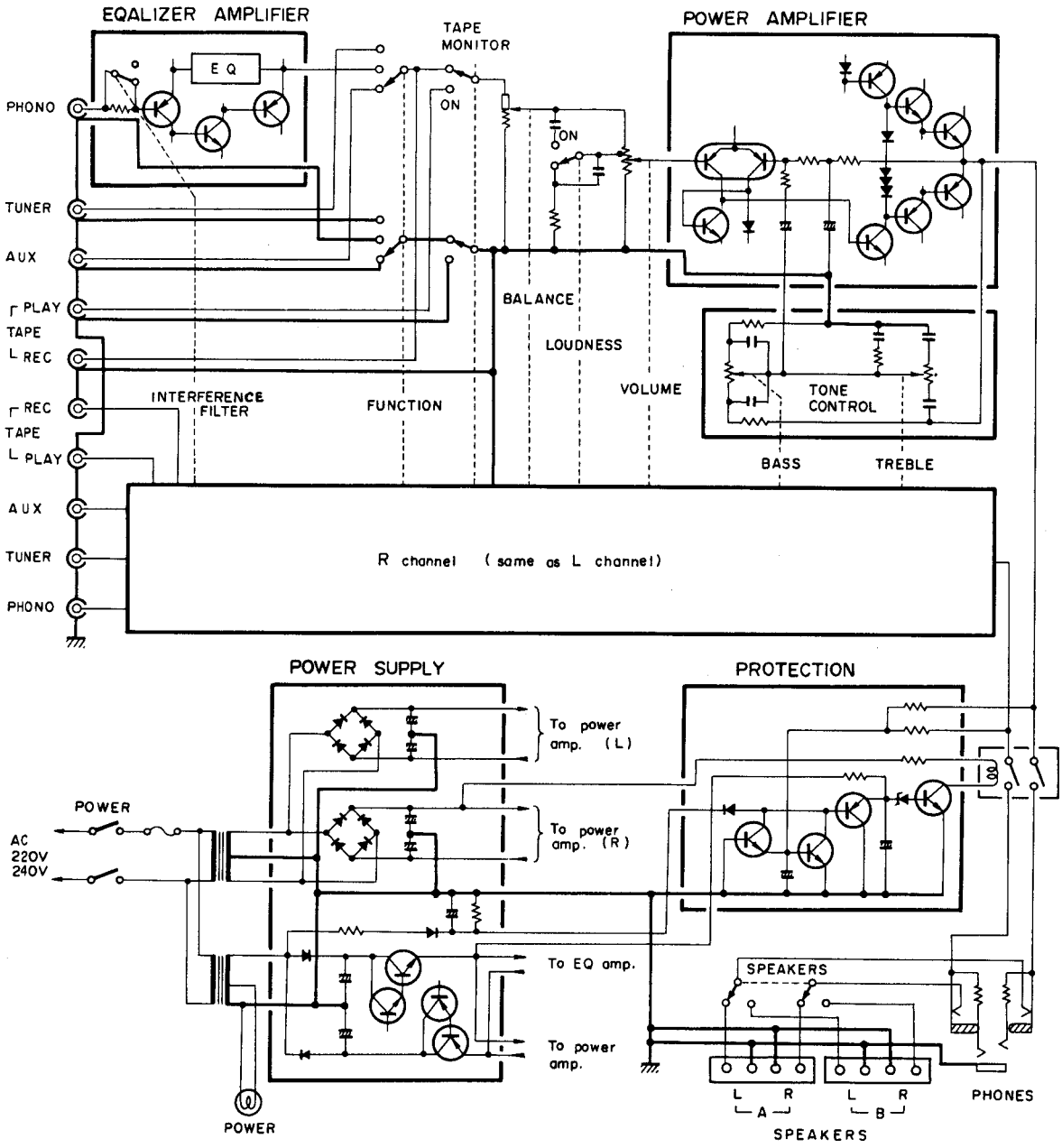
Top View with Top Cover Removed

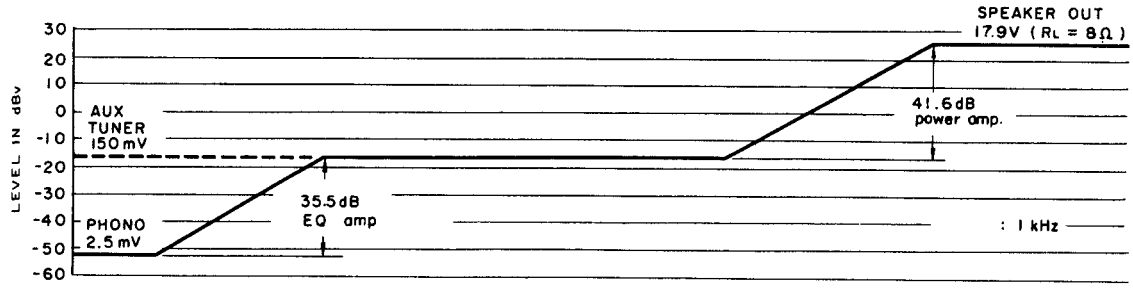


Rear Panel View



5. BLOCK DIAGRAM





Parts List of Exploded View

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Key No.	Part No.	Description
1.	ANE-197	Top plate
2.	ABA-198	Screw 3x8
3.		Heat sink L
4.	AEC-288	Insulator
*5.	2SD848A	Transistor
*6.	2SB758A	Transistor
7.		Heat sink A
8.		Heat sink B
9.	AEC-527	Insulator
10.	ABA-173	Screw 2.5x12
11.	ANB-695	Front panel assembly
12.	AEC-451	Side panel L
13.	AEC-452	Side panel R
14.	ABA-202	Screw 2.6x6
15.	ABA-034	Screw 3x4
16.	ABA-034	Screw 3x4
17.	ABA-063	Screw 3x8
18.	M45-086	Washer M9
19.	B71-004	Nut M9
20.	AEC-351	Foot assembly
21.	ABA-143	Screw 3x12
22.	AAB-191	Knob (BASS, TREBLE)
23.	AAB-192	Knob (BALANCE)
24.	AAB-189	Knob (VOLUME)
25.	AAB-190	Knob (FUNCTION)
26.	ABA-048	Screw 3x6
⚠27.	ATT-553	Power transformer
⚠28.	AEK-409	Fuse 125mA
⚠29.	AEK-408	Fuse 160mA
⚠30.	AEK-018	Fuse 1.25A
31.	AWR-181	Fuse assembly
32.		Plate
33.	ABA-067	Screw 3x10
34.	ABE-047	Washer
35.	GWH-116	Power amp assembly L
36.		Frame
37.	GWX-255	Phone jack assembly
⚠38.	ASK-511	Lever switch (POWER)
39.	AWM-162	Protection control assembly
40.	AEL-069	Lamp with wires
41.		Lamp holder
42.		Cover
43.	AAD-150	Knob
44.	ABA-069	Screw 4x8
45.		Frame
⚠46.	ATT-552	Power transformer
47.		Frame
48.	GWH-117	Power amp assembly R

Key No.	Part No.	Description
⚠49.	AKP-026	AC socket (AC OUTLET)
⚠50.	AKX-057	Voltage selector
51.		Rear panel
52.	AKE-038	Terminal (SPEAKERS)
53.	AKB-058	Terminal (TAPE, AUX)
54.	AKB-056	Terminal (INPUT)
55.	GWX-264	Input terminal assembly
56.	ABA-082	Screw 3x10
57.	ABA-115	Screw 3x10
58.	ABA-228	Screw 3x6
59.	AEC-327	Strain relief
⚠60.	ADG-032	AC power cord
61.		Terminal (GND)
62.	ABE-005	Washer
63.	ABA-056	Screw 3x6
64.	GWF-114	Equalizer assembly
65.		Plate
66.		Bottom plate
⚠67.	ACG-004	Ceramic capacitor
68.	AEC-099	Cover
69.		Heat sink R
70.	ABA-181	Screw 3x10
71.	ABE-012	Washer

* hfe of 2SD848A and 2SB758A should have of same value.

9. SCHEMATIC DIAGRAM, P.C. BOARD PATTERNS AND PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 x 10¹*	*561*	*RD¼PS* 5 6 1 *J*
47kΩ	*47 x 10³*	*473*	*RD¼PS* 4 7 3 *J*
0.5Ω	*0R5*		*RN2H* 0 R 5 *K*
1Ω	*010*		*RSIP* 0 1 0 *K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 x 10¹*	*5621*	*RN¼SR* 5 6 2 1 *F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

9.1 MISCELLANEA

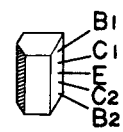
Miscellaneous Parts

Part No.	Symbol & Description	
⚠ ATT-552	T1	Power transformer
⚠ ATT-553	T2	Power transformer
AEL-069	PL1	Lamp with wires
⚠ AEK-018	FU1	Fuse 1.25A
⚠ AEK-408	FU2	Fuse 160mA
⚠ AEK-409	FU3	Fuse 125mA
* 2SD848A	Q1, Q2	
* 2SB758A	Q3, Q4	
⚠ ASK-511	S5	Lever switch (POWER)
⚠ AKX-057	S6	Voltage selector
⚠ ACG-004	C1	Ceramic capacitor
AKB-058		Terminal (TAPE, AUX)
AKB-056		Terminal (INPUT)
AKE-038		Terminal (SPEAKERS)
⚠ AKP-026		AC socket (AC OUTLET)
⚠ ADG-032		AC power cord

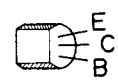
* hfe of 2SD848A and 2SB758A should have of same value.

External Appearances of Transistors

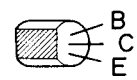
2SA978
2SA798



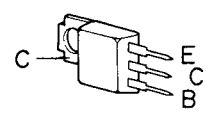
2SC1919
2SC1914



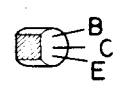
2SA912
2SC1885



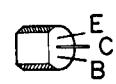
2SB527
2SD357



2SC945A
2SC1400
2SA733
2SC1318



2SC1735
2SA850



6. CIRCUIT DESCRIPTIONS

Equalizer Amplifier

The SA-3000 features a 3-stage direct-coupled equalizer amplifier for greater reduction of noise and distortion.

Besides the use of an ultra low-noise transistor in the first stage, the adoption of low impedance input resistance and equalizer circuit has contributed to an S—N ratio of at least 86dB (at 2.5mV input, IHF-A). And by setting the first and second stage load impedance at a high level (by using a high power supply voltage), and also incorporating a low frequency response compensator circuit, a high loop gain has been obtained for the 20Hz ~ 20kHz range. So while employing only 3 transistors, a very low distortion rate of less than 0.003% (20Hz ~ 20kHz, REC output 3V) has been achieved. Furthermore, specifications such as maximum allowable input of 230mV (1kHz, 0.01% THD) and equalizer deviation of ±0.3dB (20Hz ~ 20kHz) further add to the truly outstanding performance of the SA-3000.

Power Amplifier Stage

This all-stage direct-coupled pure complementary SEPP circuit features a current mirror load differential amplifier in the first stage, and incorporates the tone control circuits in the NFB loop.

Although the incorporation of the tone control circuits in the power amplifier stage reduces the number of elements that the signal has to pass through, and thereby further reduces noise, distortion, and cost, the power stage does require a higher gain and a higher degree of stability. In the SA-3000, this high gain and high stability are achieved by a current mirror load differential amplifier in the first stage and by the use of a constant current circuit for the load of the pre-driver stage. Furthermore, the tendency for the pre-driver stage capacitance impedance load to cause deterioration in the high end frequency response is suppressed by inserting a capacitor (C) between the emitter of the pre-driver stage (Q_2) and the base of the constant current circuit (Q_1) as shown in Fig. 6-1. At frequencies where the reactance of this capacitor may be ignored, the push-pull action of Q_1 and Q_2 serves to counteract the high end frequency response deterioration.

The power amplifier stage is a complementary 2-stage Darlington connection, resulting in an output power rating of 40W + 40W (8Ω, 20Hz ~ 20kHz), harmonic distortion of less than 0.02% (20Hz ~ 20kHz at rated output), and output power bandwidth of 5Hz ~ 100kHz (0.05% THD). Certainly a superb performance for an amplifier of this class is obtained.

The tone control circuits in the NFB loop employ variable resistors with built-in switching mechanisms. When turned to the central position (OFF position), all capacitors and other tone control elements which effect the frequency response are switched out of the signal path, resulting in an extremely flat frequency response without the slightest trace of deviation.

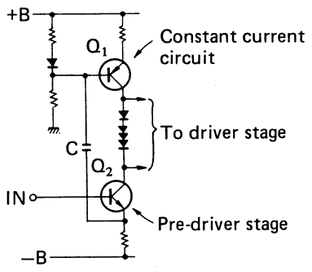


Fig. 6-1 Pre-driver stage

Protection Circuit

Besides protecting the speakers if a DC voltage should happen to appear at the power amplifier stage outputs, this circuit also mutes the signal path when the power switch is turned on and off. (See Fig. 6-2).

If for any reason a DC voltage (in excess of about ±5V) should happen to appear in the output of the power amplifier stage, it is detected immediately by either Q_6 or Q_7. Q_6 is turned on by a positive voltage, and Q_7 by a negative voltage. In either case, Q_5 is also turned on, and Q_8 turned off, thereby opening the relay contact to disconnect the power amplifier stage from the speakers. R_{39}, R_{38} and C_{27} constitute a low-pass filter which prevents the misoperation of the protection circuit by voice signals.

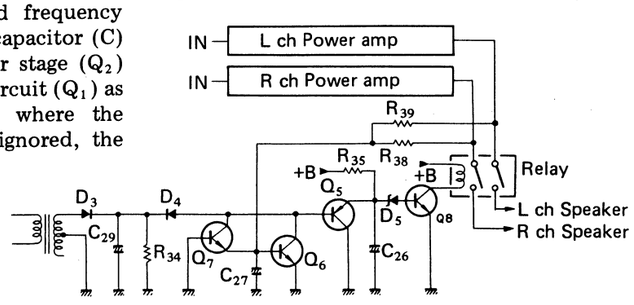


Fig. 6-2 Protection circuit

The muting action when the power switch is turned on is achieved by delaying the rise of the Q_8 base potential by means of the R_{35} /C_{26} time constant circuit. When the power switch is turned on, C_{26} is charged up via R_{35}, thereby increasing the voltage across both ends of this capacitor. When this voltage exceeds the zener voltage of the D_5 zener diode, Q_8 is biased in the forward direction, and is thereby turned on to close the relay contact.

When the power switch is turned off, C_{29} discharges rapidly via R_{34}, resulting in Q_5 being turned on, and Q_8 being turned off, thereby opening the relay contact.

Power Supply Circuit

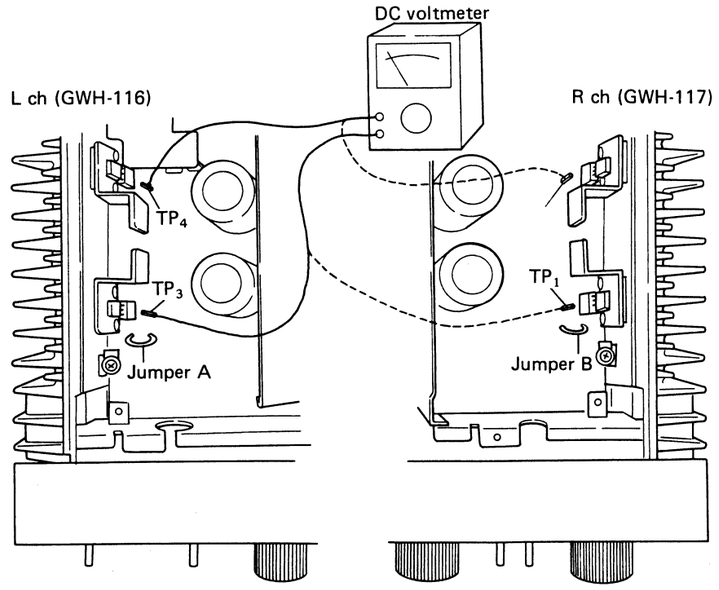
By using 2 power transformers, the power supply for the class A amplifier stages (equalizer amplifier, and other stages up to the power amplifier pre-driver) and the class B amplifier (power amplification stage) have been made independent. Because of the large changes in operational current in the class B amplifier stage, the resultant power supply voltage variations can easily effect the performance of class A amplifiers. This can result in loss of clarity in the low frequency range in the same channel, and also deterioration in localization in the other channel. These undesirable effects may be avoided by simply preventing them from interfering with any of the preceding stages, which is exactly what independent power supplies achieve.

If the power supply of a class A amplifier is half-wave rectified, 2 separate voltages (positive and negative) may be applied to each stage via a transistor equipped ripple filter. The class B amplifier power supply stage employs a toroidal transformer, separate center-tapped bridged rectifiers for left and right channels, and two 6800μF capacitors.

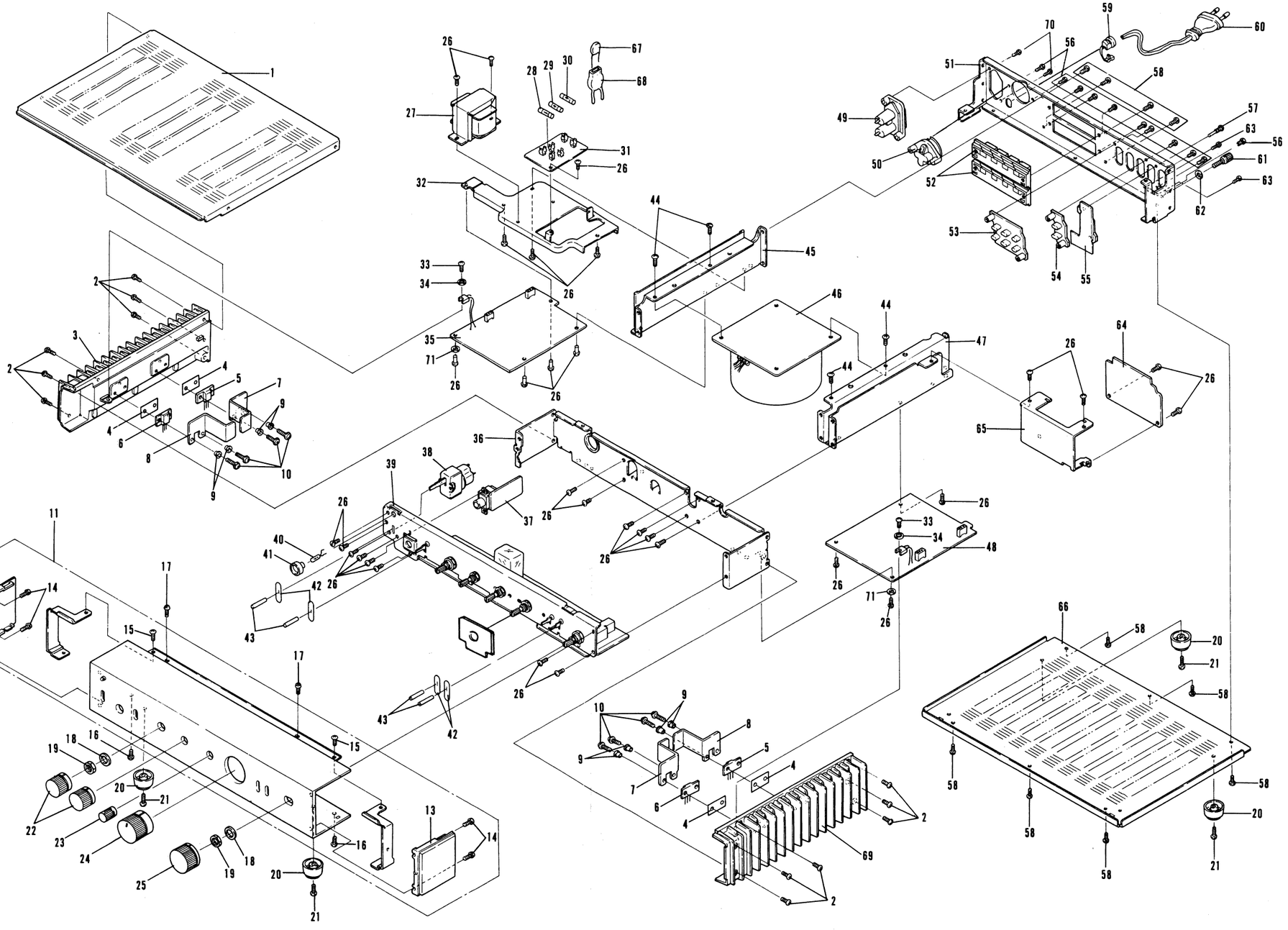
7. ADJUSTMENT

Idle Current Adjustment

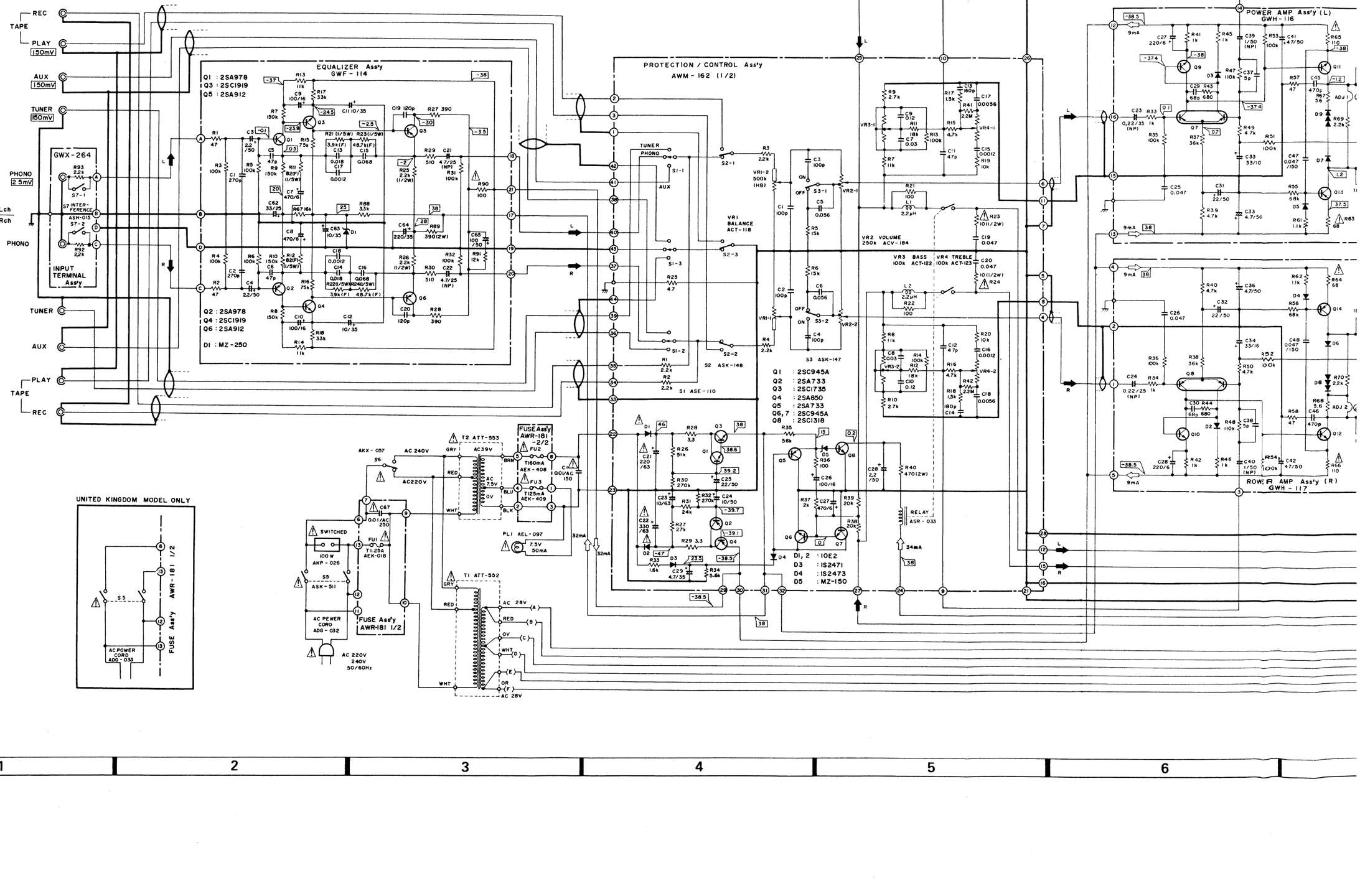
1. Turn the VOLUME control down to minimum level, turn the power on, and then wait about 10 minutes.
2. Connect up DC voltmeter as shown in the diagram.
3. Check that the voltage between TP_3 and TP_4 (left channel) lies within the DC 9.4mV ~ 66mV range. Then make a similar check for the right channel (voltage between TP_1 and TP_2). If the voltage is less than 9.4mV, cut jumper A for left channel, and jumper B for right channel. If the voltage exceeds 66mV, check for circuit failure.



8. EXPLODED VIEW



9.2 SCHEMATIC DIAGRAM



NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

1. RESISTOR;
   indicated in Ω, 1/4W, ±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10% tolerance.
2. CAPACITORS;
   Indicated in capacity (μF)/voltage(V) unless otherwise noted p; pF
   Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE, CURRENT;
   V ; Signal voltage at 40W + 40W 8Ω output
   ; DC voltage (V) at no input signal
   Value in ( ) is DC voltage at rated power.
   ⇦mA ; DC current at no input signal
4. OTHERS;
   ➡ ; Signal route.
   Ø ; Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

PROTECTION / CONTROL Ass'y
AWM - 162 (1/2)

POWER AMP Ass'y (L)
GWH - 116

D3 :1S2473
D5 :1S2473
D7 :1S2473
D9 :STV3H
D10~13:GP-20D

Q7 : 2SA798
Q9 : 2SC1914A
Q11 : 2SC1885
Q13 : 2SA912
Q15 : 2SB527
Q17 : 2SD357

HEADPHONES JACK Ass'y
GWX - 255

HEADPHONES
67mV/8Ω
SP AT 1W

AWM-162 2/2

Lch
SPEAKER - A
Rch

17.9V/8Ω

Lch
SPEAKER - B
Rch

S4 ASK-148

TUNER
PHONO
AUX

VR1 BALANCE ACT-118
VR2 VOLUME 250k ACV-164
VR3 BASS 100k ACT-122
VR4 TREBLE 100k ACT-123

S1 ASE-110
S2 ASK-148
S3 ASK-147

Q1 : 2SC945A
Q2 : 2SA733
Q3 : 2SC1735
Q4 : 2SA850
Q5 : 2SA733
Q6,7 : 2SC945A
Q8 : 2SC1318

FUSE Ass'y
AWR-181 -2/2
FU2 T160mA AEK-408
FU3 T125mA AEK-409

PL1 AEL-097
7.5V 30mA

RELAY ASR-033

D1, 2 :1OE2
D3 :1S2471
D4 :1S2473
D5 :MZ-150

ADJ 1 Ø IDLE ADJ
ADJ 2 Ø IDLE ADJ

ROWER AMP Ass'y (R)
GWH - 117

D2 :1S2473
D4 :1S2473
D6 :1S2473
D8 :STV3H
D14~17:GP-20D

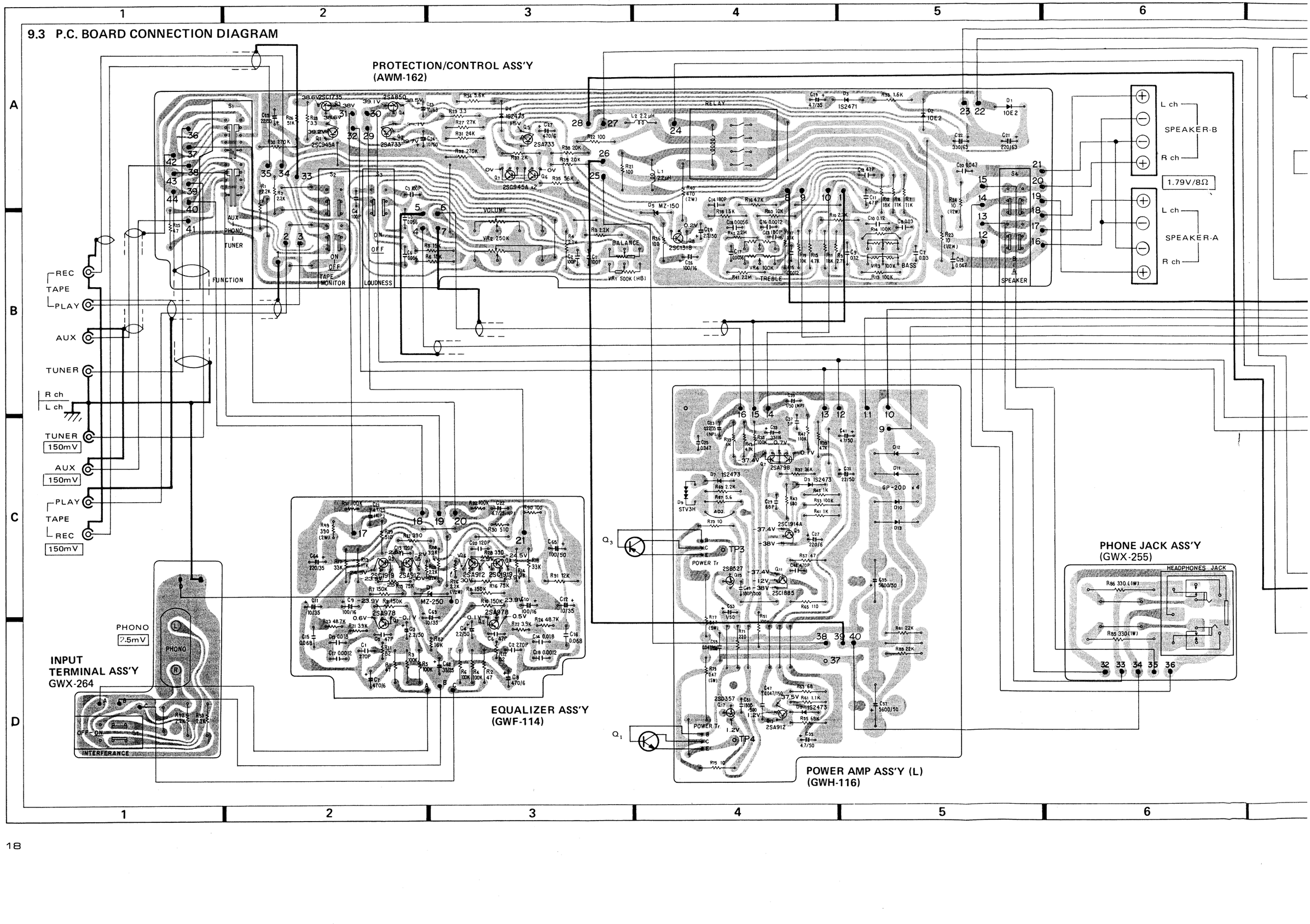
Q8 : 2SA798
Q10 : 2SC1914A
Q12 : 2SC1885
Q14 : 2SA912
Q16 : 2SB527
Q18 : 2SD357

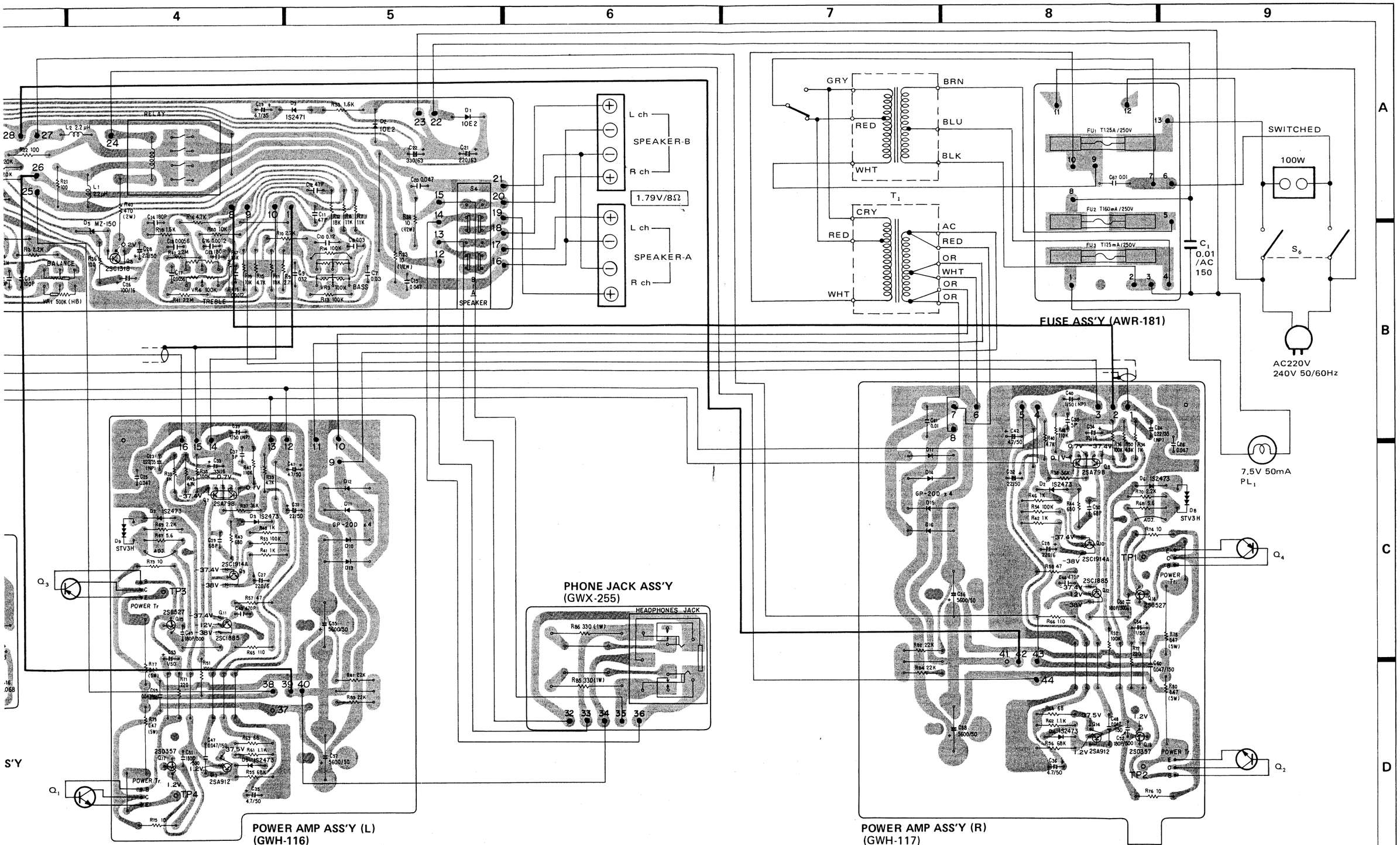
SWITCHED

S1	FUNCTION	TUNER-PHONO-AUX
S2	TAPE MONITOR	OFF-ON
S3	LOUDNESS	OFF-ON
S4	SPEAKERS	A-B
S5	POWER	OFF-ON
S6	LINE VOLTAGE SELECTOR	220V-240V

The underlined indicates the switch position

9.3 P.C. BOARD CONNECTION DIAGRAM




4
5
6
7
8
9
A
B
C
D
RELAY
L2 2.2 μH
L1 2.2 μH
D5 MZ-150
2SC1318
BALANCE
VR1 500K (HB)
TREBLE
VR4 100K
BASS
VR3 100K
VR2 100K
S4
SPEAKER
L ch
SPEAKER-B
R ch
1.79V/8Ω
L ch
SPEAKER-A
R ch
GRY
BRN
RED
BLU
WHT
BLK
T1
CRY
AC
RED
OR
WHT
OR
RED
OR
WHT
FUSE ASS'Y (AWR-181)
FU1 T1.25A/250V
FU2 T160mA/250V
FU3 T125mA/250V
C1 0.01/AC 150
SWITCHED
100W
S6
AC220V
240V 50/60Hz
7.5V 50mA
PL1
PHONE JACK ASS'Y
(GWX-255)
HEADPHONES JACK
POWER AMP ASS'Y (L)
(GWH-116)
POWER AMP ASS'Y (R)
(GWH-117)
2SA798
2SC1914A
2SC1885
2SD357
2SA912
2SB527
IS2473
GP-20D
STV3H
POWER Tr
TP1
TP2
TP3
TP4
Q1
Q2
Q3
Q4

9.4 PARTS LIST OF P.C. BOARD ASSEMBLIES

Equalizer Assembly (GWF-114)

CAPACITORS

Part No.	Symbol & Description
CQSA 271J 50	C1, C2
CEANL 2R2M 50	C3, C4
CEA 100P 35	C11, C12, C63
CEA 101P 16	C9, C10
CEA 221P 35	C64
CEA 330P 25	C62
CEA 471P 6	C7, C8
CEA 101P 50	C65
CCDSL 470K 50	C5, C6
CCDSL 121K 50	C19, C20
CQMA 122J 50	C17, C18
CQMA 183J 50	C13, C14
CQMA 683J 50	C15, C16
ACH-318	C21, C22

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RD¼PM □□□ J	R1–R10, R13–R18, R27–R29, R88, R91
RN⅕SQ □□□□ F	R11, R12, R21–R24
RD½PS □□□ J	R25, R26
⚠RD¼PSF □□□ J	R90
⚠RS2P □□□ J	R89
RD¼VS □□□ J	R30–R32, R87

SEMICONDUCTORS

Part No.	Symbol & Description
2SA978	Q1, Q2
2SC1919	Q3, Q4
2SA912	Q5, Q6
MZ-250 (WZ-250)	D1

Phone Jack Assembly (GWX-255)

Part No.	Symbol & Description	
AKN-024		Phones jack
RS1P 331J	R85, R86	

Input Terminal Assembly (GWX-264)

Part No.	Symbol & Description	
RD¼PM 222J	R92, R93	
AKB-060		Terminal (INPUT)
ASH-015	S7	Slide switch (INTERFERENCE)

Fuse Assembly (AWR-181)

Part No.	Symbol & Description	
⚠ ACG-001	C67	Ceramic capacitor

Power Amp Assembly L (GWH-116)

OTHER

Part No.	Symbol & Description
AKH-009	Transistor socket

CAPACITORS

Part No.	Symbol & Description
ACH-304	C23
ACH-326	C39
ACG-009	C47, C59
⚠ACH-211	C55, C57
CEA 010P 50	C53
CEA 220P 50	C31
CEA 221P 6	C27
CEA 330P 16	C33
CEA 4R7P 50	C35, C41
CCDSL 181K 500	C49, C51
CCDSL 680K 50	C29
CKDYB 471K 50	C45
CKDYF 473Z 50	C25
CCDSL 050D 50	C37

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RD¼PS □□□ J	R33, R35, R37, R39, R41, R43, R45, R47, R49, R51, R53, R55, R57, R61
RD¼PS □□□ J	R67, R69, R73, R75, R81, R83
⚠RD¼PSF □□□ J	R63, R65, R71
ACN-036	R77, R79

SEMICONDUCTORS

Part No.	Symbol & Description
2SA798	Q7
2SC1914 (2SC1400)	Q9
2SC1885	Q11
2SA912	Q13
*2SB527	Q15
*2SD357	Q17
1S2473	D3, D5, D7
STV3H-0	D9
⚠GP-20D	D10–D13

* hfe of 2SB527 and 2SD357 should have the same value.

Power Amp Assembly R (GWH-117)

OTHER

Part No.	Symbol & Description
AKH-009	Transistor socket

CAPACITORS

Part No.	Symbol & Description
ACH-304	C24
ACH-326	C40
ACG-009	C48, C60
⚠ACH-211	C56, C58
ACG-004	C61
CEA 010P 50	C54
CEA 220P 50	C32
CEA 221P 6	C28
CEA 330P 16	C34
CEA 4R7P 50	C36, C42
CCDSL 181K 500	C50, C52
CCDSL 680K 50	C30
CKDYB 471K 50	C46
CKDYF 473Z 50	C26
CCDSL 050D 50	C38

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RD¼PS □□□J	R34, R36, R38, R40, R42, R44, R46, R48, R50, R52, R54, R56, R58
RD¼PS □□□J	R66, R68, R70, R74, R76, R82, R84
⚠RD¼PSF □□□J	R62, R64, R72
ACN-036	R78, R80

SEMICONDUCTORS

Part No.	Symbol & Description
2SA798	Q8
2SC1914 (2SC1400)	Q10
2SC1885	Q12
2SA912	Q14
*2SB527	Q16
*2SD357	Q18
1S2473	D2, D4, D6
STV3H-0	D8
⚠GP-20D	D14–D17

* hfe of 2SB527 and 2SD357 should have the same value.

Protection Control Assembly (AWM-162)

OTHERS

Part No.	Symbol & Description
ASR-033	Relay
ABN-051	Union nut
ABN-046	Union nut
B71-004	Washer M9
M45-086	Washer M9
B22-018	Washer
B71-010	Nut M7
ABA-026	Screw 3x6

CAPACITORS

Part No.	Symbol & Description
CCDSL 101K 50	C1–C4
CQMA 563K 50	C5, C6
CQMA 124J 50	C9, C10
CQMA 122J 50	C15, C16
CQMA 303J 50	C7, C8
CQMA 562J 50	C17, C18
CQMA 473K 50	C19, C20
CEA 100P 63	C23
CEA 100P 50	C24
CEA 101P 16	C26
CEA 2R2P 50	C28
CEA 220P 50	C25
CEA 221P 63	C21
CEA 331P 63	C22
CEA 4R7P 35	C29
CEA 471P 6	C27
CQSA 181J 50	C13, C14
CQSA 470J 50	C11, C12

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description	
ACT-118	VR1	Variable (BALANCE)
ACV-184	VR2	Variable (VOLUME)
ACT-122	VR3	Variable (BASS)
ACT-123	VR4	Variable (TREBLE)
RD¼PS □□□ J	R1–R22, R25–R39	
⚠ RD½PSF □□□ J	R23, R24	
RS2P □□□ J	R40	
RD¼PM □□□ J	R41, R42	

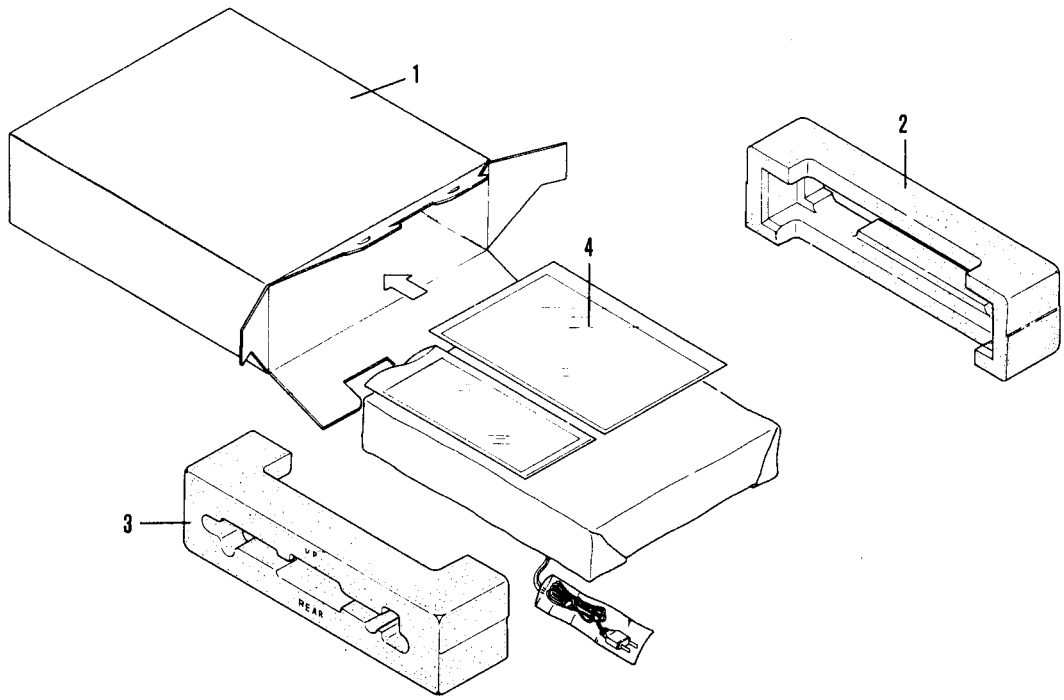
SEMICONDUCTORS

Part No.	Symbol & Description
2SC945A	Q1, Q6, Q7
2SA733	Q2, Q5
2SC1735	Q3
2SA850	Q4
2SC1318	Q8
⚠ 10E2 (1S1886)	D1, D2
1S2471	D3
1S2473 (1S2076)	D4
WZ-150 (MZ-150)	D5

SWITCHES

Part No.	Symbol & Description	
ASD-071 (ASE-110)	S1	Rotaly (FUNCTION)
ASK-148	S2	Lever (TAPE MONITOR)
ASK-148	S4	Lever (SPEAKERS)
ASK-147	S3	Lever (LOUDNESS)

10. PACKING



Key No.	Part No.	Description
1.	AHD-671	Packing case
2.	AHA-223	Front pad
3.	AHA-224	Rear pad
4.	ARB-305	Operating instructions (English)
	ARD-128	Operating instructions (German/French)

11. SUPPLEMENTS FOR HB TYPE

Model SA-3000/HB is the same as SA-3000/HE with exception of description in this supplements.

CONTRAST OF MISCELLANEOUS PARTS

Symbol	Description	Part No.		Remarks
		HE type	HB type	
⚠	AC socket (AC OUTLETS)	AKP-026	.....	
⚠	AC power cord	ADG-032	ADG-033	
	Operating instructions (German/French)	ARD-128	.....	